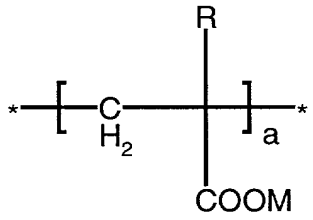
CLAIMS

1. A modified acrylic polymer obtainable by reacting

(A) a poly(acrylic acid) with endgroups resulting from initiators and/or chain transfer agents that are inert for condensation reactions, said poly(acrylic acid) A-1 having a molecular weight of from 500 to 20'000



A-1

and

(B) o molar parts of a monofunctional polyalkyleneglycol-monoalkylether B-1

$$HO\text{-}(A\text{-}O\text{-})_r\text{-}(B\text{-}O\text{-})_sR^1 \qquad \textbf{B-1}$$

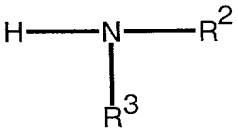
and/or, optionally

(C) p molar parts of a monofunctional α-amino-polyalkyleneglycol-ω-alkylether C-1

$$H_2N\text{-}(A\text{-}O\text{-})_t\text{-}(B\text{-}O\text{-})_uR^1 \qquad \textbf{C-1}$$

and/or, optionally

(D) q molar parts of a primary or secondary amine D-1



D-1

wherein R represents a hydrogen atom or a methyl group, or a mixture thereof;

M represents a hydrogen atom, a C_1 - C_5 alkyl rest or an alkali metal, an alkaline earth metal or other two or three valent metal atoms, an ammonium or organic ammonium group, or a mixture thereof;

each R^1 independently from each other is a C_1 - C_4 alkyl rest, A and B represent alkylene groups with 2 - 4 C-atoms, the mixture of (A-O) and (B-O) may be formed by either random addition or block addition, and (A-O) ≠ (B-O);

whereby preferred at least 0.5 mole-%, more preferred 5 - 100 mole-% and most preferred 50 - 100 mole-% of **B-1** is represented by a structure in which A represents an alkylene group with 2 C-atoms and s=0, or in which B represents an alkylene group with 2 C-atoms and r=0, and

whereby preferred at least 0.5 mole-%, more preferred 5 - 100 mole-% and most preferred 50 - 100 mole-% of the formula **C-1** is represented by a structure in which A represents an alkylene group with 2 C-atoms and u=0, or in which B represents an alkylene group with 2 C-atoms and t=0,

R^2 and R^3 independently from each other represent a hydrogen atom, or an aliphatic, cycloaliphatic, araliphatic or aromatic rest, or R^2 and R^3 may together with the nitrogen atom to which they are bound form a morpholine or imidazole ring system, or another ring systems containing at least one hetero atom like nitrogen, sulfur or oxygen; or R^2 and R^3 independently from each other represent oxyalkylene groups of the structure $R^5-(O-R^6)_v-$, wherein R^5 represents a C_1 - C_4 al-

kyl rest and O-R^6 represents an oxyalkylene group with 2 to 4 carbon atoms, whereby within the same structure R^5-(O-R^6)$_v$-, O-R^6 can represent more than one kind of oxyalkylene group, wherein the mixture may be formed by either random addition or block addition;

whereby O-R^6 comprises preferred at least 0.5 mole-%, more preferred 5 - 100 mole-% and most preferred 50 - 100 mole-% of an oxyalkylene group with 2 C-atoms,

in a molar ratio of

a:o:p:q = 1:(0.1-0.95):(0-0.6):(0-0.6), preferably a:o:p:q = 1:(0.1-0.95):(0-0.3):(0-0.3), more preferably a:o:p:q = 1:(0.1-0.95):(0-0.1):(0-0.1), still more preferably a:o:p:q = 1:(0.1-0.95):(0-0.05):(0-0.05), even more preferably a:o:p:q = 1:(0.1-0.95):(0-0.02):(0-0.02), and most preferably a:o:p:q = 1:(0.1-0.95):(0-0.01):(0-0.01), and

wherein $p + q < 0.9$, preferred $p + q < 0.6$, more preferred $p + q < 0.3$, still more preferred $p + q < 0.1$, even more preferred $p + q < 0.05$, much more preferred $p + q < 0.02$, and most preferred $p + q < 0.01$, and

$o + p + q \leq a$;

r, s, t, u and v independently represent integers from 0 - 250;

$r + s > 1$;

$t + u > 1$;

in the presence of a catalyst at elevated temperatures following a certain kinetic influenced by the ratio of A-1, B-1 and/or, optionally C-1 and/or D-1 and temperature, in which the reaction can be followed by the decrease of the acid number over the time, in which the reaction can be stopped at

different reaction times resulting into polymers with different properties, said reaction is stopped

I. at a high slope of decrease of the acid number over the time resulting into polymers with a high initial water reduction and a decreasing slump flow over the time

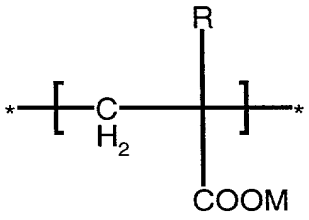
or

II. at a medium slope of decrease of the acid number over the time resulting into polymers with a high or medium initial water reduction and a constant slump flow over the time

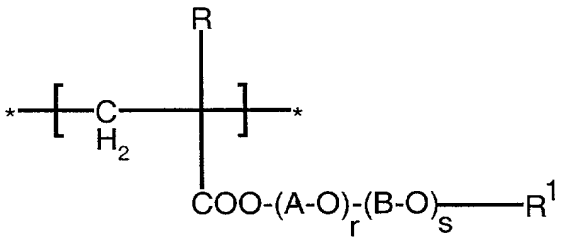
or

III. at a small slope of decrease or no decrease of the acid number over the time resulting into polymers with a medium or low initial water reduction and an increasing slump flow over the time.

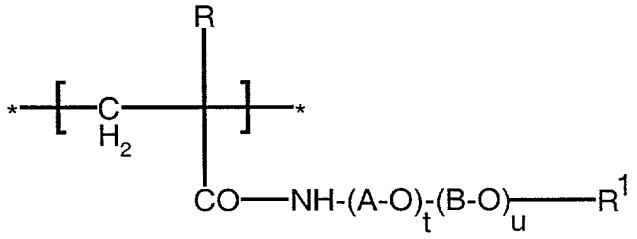
2. A modified acrylic polymer, obtainable by the reaction defined in claim 1 which is composed of m molar units of the group given by formula A below, o molar units of the group given by formula B below, optionally p molar units of the group given by formula C below, and/or optionally q molar units of the group given by formula D below, whereby:



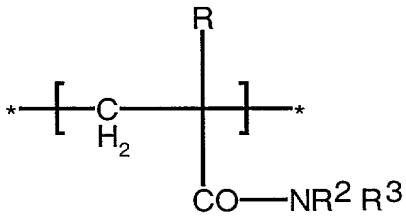
A



B



C



D

wherein R represents a hydrogen atom or a methyl group, or mixture thereof;

M represents a hydrogen atom, a C_1 - C_5 - alkyl rest or an alkali metal, an alkaline earth metal or other two or three valent metal atoms, an ammonium or organic ammonium group, or a mixture thereof;

each R^1 independently from each other is a C_1 - C_4 alkyl rest, A and B represent alkylene groups with 2 - 4 C-atoms, the mixture of (A-O) and (B-O) may be formed by either random addition or block addition, and (A-O) ≠ (B-O);

whereby preferred at least 0.5 mole-%, more preferred 5-100 mole-% and most preferred 50 - 100 mole-% of **B** is represented by a structure in which A represents an alkylene group with 2 C-atoms and s=0, or in which B represents an alkylene group with 2 C-atoms and r=0, and

whereby preferred at least 0.5 mole-%, more preferred 5-100 mole-% and most preferred 50 - 100 mole-% of the formula **C** is represented by a structure in which A represents an alkylene group with 2 C-atoms and u=0, or in which B represents an alkylene group with 2 C-atoms and t=0,

R^2 and R^3 independently from each other represent a hydrogen atom, or an aliphatic, cycloaliphatic, araliphatic or aromatic rest, or R^2 and R^3 may together with the nitrogen atom to which they are bound form a morpholine or imidazole ring system, or another ring systems containing at least one hetero atom like nitrogen, sulfur or oxygen; or R^2 and R^3 independently from each other represent oxyalkylene groups of the structure R^5-$(O\text{-}R^6)_v$-, wherein R^5 represents a C_1 - C_4 alkyl rest and $O\text{-}R^6$ represents an oxyalkylene group with 2 to 4 carbon atoms, whereby within the same structure R^5-$(O\text{-}R^6)_v$-, $O\text{-}R^6$ can represent more than one kind of oxyalkylene group, wherein the mixture may be formed by either random addition or block addition;

whereby O-R^6 comprises preferred at least 0.5 mole-%, more preferred 5 - 100 mole-% and most preferred 50 - 100 mole-% of an oxyalkylene group with 2 C-atoms;

r, s, t, u and v independently represent integers from 0 - 250;
r + s > 1;
t + u > 1;

m, o, p, q are numerical values representing the molarity of the constituent units A, B, C and D present in the polymers, in a proportion of

m:o:p:q = (0.05 - 0.9):(0.1-0.95):(0-0.6):(0-0.6),), preferred m:o:p:q = (0.05-0.9):(0.1-0.95):(0-0.3):(0-0.3), more preferred m:o:p:q = (0.05-0.9):(0.1-0.95):(0-0.1):(0-0.1), still more preferred m:o:p:q = (0.05-0.9):(0.1-0.95):(0-0.05):(0-0.05), even more preferred m:o:p:q = (0.05-0.9):(0.1-0.95):(0-0.02):(0-0.02), and most preferred m:o:p:q = (0.05-0.9):(0.1-0.95):(0-0.01): 0-0.01),

and wherein p + q < 0.85, preferred p + q < 0.6, more preferred p + q < 0.3, still more preferred p + q < 0.1, even more preferred p + q < 0.05, much more preferred p + q < 0.02, and most preferred p + q < 0.01,

such, that m + o + p + q = 1.

3. The modified acrylic polymer according to claim 1 or 2, characterized in that the number average molecular weight is from 4000 to 100'000.

4. The modified acrylic polymer according to anyone of claims 1 to 3, characterized in that it is obtainable by a synthesis wherein the reactant A-1 has a number average molecular weight of from 1000 to 10'000.

5. The modified acrylic polymer according to anyone of claims 1 to 4, characterized in that it is obtainable

by a synthesis wherein the reactant B-1 has a number average molecular weight of from 250 to 10'000 and the reactant C-1 has a number average molecular weight of from 250 to 10'000.

6. The modified acrylic polymer according to anyone of claims 1 to 5, characterized in that it is obtainable by reacting reactants A-1 and B-1, and optionally C-1 and/or D-1 in the presence of an acid catalyst, most preferred sulfuric acid or p-toluene-sulfonic acid at a temperature of about 140°C to 250°C, preferably 150°C to 200°C.

7. The modified acrylic polymer according to anyone of claims 1 to 6, characterized in that it is obtainable by a synthesis that is carried out using inert organic solvents as carrier.

8. The modified acrylic polymer according to anyone of claims 1 to 7, obtainable by using reactants A-1 and B-1, and optionally C-1 and/or D-1, whereby the reaction was stopped at a high slope of the decrease of the acid number over the time resulting in a polymer with a high initial water reduction and a decreasing slump flow over the time, which can be used especially for precast applications.

9. The modified acrylic polymer according to anyone of claims 1 to 7, obtainable by using reactants A-1 and B-1, and optionally C-1 and/or D-1, whereby the reaction was stopped at a medium slope of the decrease of the acid number over the time resulting in a polymer with a high or medium initial water reduction and a constant slump flow over the time, which can be used especially for readymix applications.

10. The modified acrylic polymer according to anyone of claims 1 to 7, obtainable by using reactants A-1 and B-1, and optionally C-1 and/or D-1, whereby the reaction was stopped at a small slope of the decrease of the acid number over the time to linear behavior resulting in a polymer with a medium or low initial water reduction and an increas-

ing slump flow over the time, which can be used especially for slump flow increasing applications.

11. The modified acrylic polymer according to anyone of the preceding claims, wherein $p + q \neq 0$, preferably $0 < p + q < 0.85$, more preferably $0 < p + q < 0.6$, still more preferably $0 < p + q < 0.3$, even more preferably $0 < p + q < 0.1$, much more preferably $0 < p + q < 0.05$, very much more preferred $0 < p + q < 0.2$, and most preferably $0 < p + q < 0.01$, and whereby a preferred lower limit is about 0.001.

12. An admixture in liquid or solid form comprising at least one modified acrylic polymer according to anyone of claims 1 to 11, most preferred according to anyone of claims 8 to 11.

13. The admixture of claim 12, characterized in that it comprises at least two modified acrylic polymers in various ratios resulting in an admixture with high water reduction and constant slump flow over the time.

14. The admixture of claim 12 or 13 furthermore comprising further dispersing agents selected from the group consisting of sulfonated melamine condensates, sulfonated naphthalene condensates, lignosulfonates, substituted maleamid-vinyl-copolymers and acrylic or methacrylic copolymers with polyalkyleneglycol side chains, and mixtures thereof.

15. A mortar, concrete, cement or cementitious binder, containing at least one modified acrylic polymer according to anyone of claims 1 to 11 in an amount of 0.01 to 10% by weight of the binder, said mortar or concrete having a unit content of binder composition of 100 to 800 kg/m^3, preferably of 250 to 650 kg/m^3, whereby said binder composition is selected from the group consisting of a cement, a mixture of cement, a latent hydraulic powder, a mixture of latent hydraulic powders, and mixtures thereof optionally together with one or more inert microscopic powder(s).

16. The mortar, concrete, cement or cementitious binder according to claim 15, characterized in that the cement is selected from the group consisting of Portland cement, white cement, high alumina cement, blended cement,and mixtures thereof, and the latent hydraulic or inert microscopic powder is selected from the group consisting of fly ash, slag, natural pozzolane, silica fume, burnt oil shale, metakaolin calcium carbonate, and mixtures thereof.

17. The mortar, concrete, cement or cementitious binder according to claim 15 or 16, characterized in that the admixture in liquid or powder form containing the modified acrylic polymers is added before, during or after the grinding operation of the cement or the cementitious binder.

18. An aqueous slurry of microscopic powder containing a modified acrylic polymer according to anyone of claims 1 to 11, or a mixture thereof, in an amount of 0.01 to 10% by weight of the binder.

19. The aqueous slurry of microscopic powder according to claim 18, characterized in that the microscopic powder is calcium carbonate, gypsum or gypsum based.